

**REMARKS**

This paper is filed in response to the office action mailed on April 5, 2005. Claims 1, 12 and 13 have been amended; claim 2 has been canceled; claims 1 and 3-20 remain pending.

Claims 1, 3, 5-9, 11-12, 14-18 and 19 stand rejected under 35 U.S.C. § 103 as being unpatentable over U.S. Patent No. 6,607,955 ("Lee") in view of U.S. Patent No. 6,585,568 ("Tsuchiya"). In response, independent claims 1 and 12 have been amended to traverse this rejection.

At the outset, under MPEP § 2142,

[t]o establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure.

*Citing, In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991); *see also* MPEP § 2143-§ 2143.03 for decisions pertinent to each of these criteria.

Independent claims 1 and 12 both recite the use of an acidic oxide film CMP slurry that has an oxidizer selected from the group consisting of hydrogen peroxide, periodic acid, ferric nitrate and combinations thereof (claim 1) or hydrogen peroxide (claim 12) and that said use of the acidic oxide film CMP slurry is carried out in a chemical mechanical polishing (CMP) process on a polysilicon layer and an interlayer insulating film. No combination of Lee and Tsuchiya teaches or suggests this process.

The base reference, Lee, merely teaches the use of a standard CMP slurry with an etching selectivity with respect to silicon nitride (column 7, line 62). Thus, Lee does not teach or suggest use of an acidic oxide film CMP slurry and the use of that slurry on both a polysilicon layer and an interlayer insulating film at the same time. Lee also does not teach or suggest the oxidizer recited in claims 1 or 12.

In an attempt to supplement Lee, the Patent Office relies upon Tsuchiya. While Tsuchiya discloses a slurry having a pH of 3 to 9 (column 6, lines 26-27), and while

the Tsuchiya slurry may include hydrogen peroxide, nowhere in Tsuchiya is it taught or suggested that the slurry be used simultaneously on a polysilicon layer and an interlayer insulating film. Nowhere in Tsuchiya is it suggested that a polysilicon contact plug and an interlayer insulating film be subjected to a CMP process at the same time using the same slurry as recited in amended claims 1 and 12.

In contrast, at page 2, lines 19-28 of the application as filed, applicants have found that when a conventional polishing process is performed using a typical slurry for an oxide film, "dishing" is generated on the polysilicon layer and the interlayer insulating film since the polishing selectivity ratio of the interlayer insulating film is higher than that of the polysilicon layer. In order to solve this problem, applicants have found that the use of an acidic slurry composition containing an oxidizer instead of a basic slurry during the CMP process provides a solution whereby the polysilicon layer and the interlayer insulating film are planarized at the same time (see Fig. 3D). Nowhere in Tsuchiya or Lee is the concept taught or suggested of using an acidic oxide film CMP slurry on a polysilicon layer and an interlayer insulating film simultaneously.

Therefore, no combination of Lee and Tsuchiya teaches or suggests every element of amended claims 1 and 12 and no *prima facie* case of obviousness has been established.

Next, the Patent Office rejects claims 4 and 13 under 35 U.S.C. § 103 as being unpatentable over Lee, Tsuchiya and further in view of U.S. Patent No. 6,635,186 ("Small"). This rejection is traversed for the same reason that the rejection based upon Lee and Tsuchiya is traversed. Specifically, the third reference cited, Small, merely includes an abrasive in the form of alumina, an oxidizing agent and a surfactant to remove aluminum, copper or tungsten. Thus, Small is directed toward a slurry for polishing metal and in no way teaches or suggests a slurry for polishing a polysilicon contact plug and an interlayer insulating film simultaneously. Thus, Small cannot supplement the deficiencies of Lee and Tsuchiya and the obviousness rejection of claims 4 and 13 are respectfully traversed.

Finally, claims 10 and 19 are rejected under 35 U.S.C. § 103 as being unpatentable over Lee, Tsuchiya and further in view of U.S. Patent No. 6,635,576 ("Liu"). Applicants respectfully submit that this rejection is traversed for the same reasons that the rejection based upon Lee and Tsuchiya is traversed. Specifically, Liu is only cited for the

proposition that it discloses a silicon oxy nitride material for the wordline structure. Liu is not cited for the proposition, nor does it disclose, the use of an acidic oxide film CMP slurry simultaneously on a polysilicon layer and an interlayer insulating film. Accordingly, independent claims 1 and 12 are allowable over any hypothetical combination of Lee, Tsuchiya and Liu and the obviousness rejection of claims 10 and 19 is respectfully traversed.

An early action indicating the allowability of this application is respectfully requested.

The Commissioner is authorized to charge any fee deficiency required by this paper, or credit any overpayment, to Deposit Account No. 13-2855.

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Respectfully submitted,

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